

## Synthesis & Characterization of Au/Ag Core-Shell Plasmonic Nanoparticles

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**Abstract:** The optical surface plasmon resonance (SPR) properties of silver nanoparticles are very important to future plasmonic technologies. However, the synthesis of silver nanoparticles under aqueous conditions with well-controlled particle morphology (size & shape) is very difficult, as silver is easily oxidized, and reactive towards many ions. To address this, we explored the possibility of growing silver shells of tailored thickness at gold nanoparticle cores. This was accomplished by reducing Ag ions in the presence of gold nanoparticle seeds under precise concentrations, including hydrothermal heating at 120 °C. Using this approach, we have synthesized Au/Ag core/shell nanoparticles with tailored shell/core thicknesses, resulting in interesting control over the resulting “plasmonic” properties. The core/shell structure of these nanoparticles was also chemically explored, in-which selective etching of the shell or core was performed. The nanoparticles were characterized via UV-visible spectrophotometry, Dynamic Light Scattering, and Transmission Electron Microscopy.